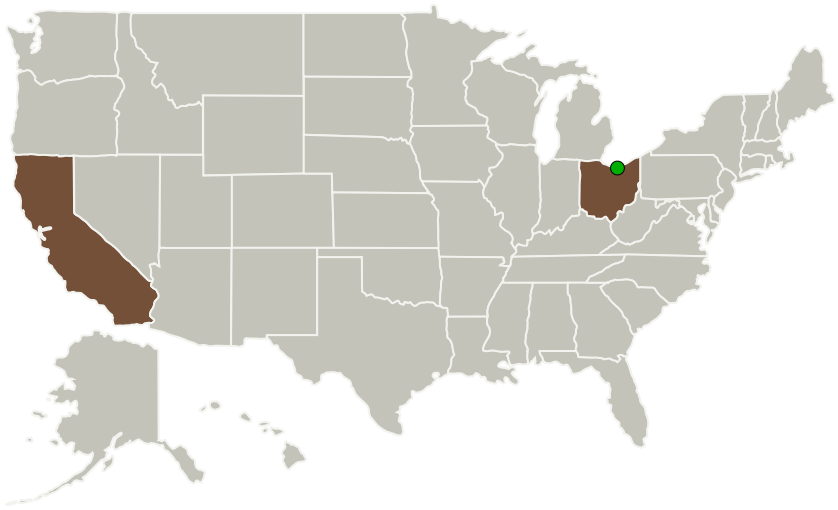
# Balanced Electric Spacecraft Thruster System, Phase I

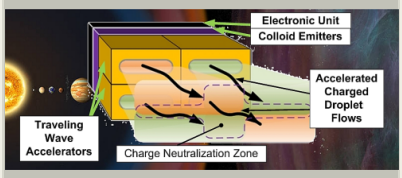
Completed Technology Project (2017 - 2017)

## Project Introduction

To address the NASA need for high-thrust electric propulsion technologies that enable/enhance mission capabilities such as attitude control and dual manifest launch opportunities, Physical Optics Corporation (POC) proposes to develop a new Balanced Electric Spacecraft Thruster (BEST) system, which is based on a novel thruster design and a new system integration. Specifically, the innovation in the propellant accelerator and a design with no charge neutralization will enable the device to fully use the potential of any ionic liquid monopropellant, including the advanced energetic monopropellant AF-M315E, the "green propellant." As a result, this technology offers balanced and throttled high thrust and variable impulse per unit of volume, which allows for the control of attitude and high efficiency, which directly address NASA's Small Spacecraft Technology Program. In Phase I, POC will demonstrate the feasibility of the BEST approach by the combination of proof-of-concept analysis and experiments with the BEST conceptual prototype to reach TRL-3. In Phase II, POC will design and build a BEST prototype, measure its performance and plume characteristics, demonstrate and deliver it to NASA to achieve TRL-6 at the end of Phase II activities.

## Primary U.S. Work Locations and Key Partners






Balanced Electric Spacecraft Thruster System, Phase I Briefing Chart Image

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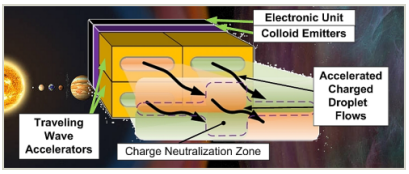
| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Physical Optics Corporation | Lead Organization | Industry | Torrance, California |
| Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |

| Primary U.S. Work Locations | |
|---|---|
| California | Ohio |

## Images




**Briefing Chart Image**
Balanced Electric Spacecraft Thruster System, Phase I Briefing Chart Image
*(https://techport.nasa.gov/image/134174)*

## Organizational Responsibility

**Responsible Mission Directorate:**
Space Technology Mission Directorate (STMD)

**Lead Organization:**
Physical Optics Corporation

**Responsible Program:**
Small Business Innovation Research/Small Business Tech Transfer

## Project Management

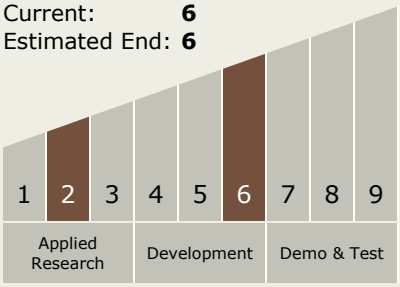
**Program Director:**
Jason L Kessler

**Program Manager:**
Carlos Torrez

**Principal Investigator:**
Naibing Ma

## Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



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## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.2 Electrostatic

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System